



ASSESSMENT OF EFFECTIVENESS OF PATIENT INTEGRATION IN A NEUROMUSCULAR COURSE

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ABSTRACT

As part of a Doctor of Physical Therapy (DPT) curriculum, students are exposed to a variety of courses that will create the basic competencies to become a safe physical therapist. Within a neuromuscular course in a large private DPT program spanning four campuses in the United States, one of the methods utilized is a patient integration lab experience. Patient integration labs incorporate the theory of experiential learning by allowing students to apply learned didactic knowledge within a specific course in its lab and actively problem solve and critical think to attain clinical knowledge that will be necessary during patient encounters. The purpose of this study was to determine if various forms of patient integration teaching methods used within a neuromuscular course may impact students' perceived confidence and performance when completing a physical therapy examination on a patient with a neuromuscular pathology. The study also aimed to determine if there was a significant difference between the various teaching methods being evaluated. A quantitative correlational design study was used. Six groups varying in the type of patient integration experience were assessed for student performance and student self-perceived confidence. Student assessment data was collected in the form of a standardized documentation assignment and final course grade averages. Student self-perceived confidence was assessed utilizing two validated surveys. Data analysis was completed in three parts. All study variables were presented using descriptive statistics. Second, a series of bivariate tests were used to produce inferential findings. A Pearson's r zero-correlation, independent-samples t -test and a One-Way ANOVA were all used to assess for possible relationships between the continuous explanatory variables and the dependent variables. Finally, a multivariate model, specifically a multiple linear regression model, was used to model each dependent variable as a function of the explanatory variables significantly related to that dependent variable in bivariate analysis. Through the multivariate models, a relationship was found between students' self-perceived confidence and student assessment as measured by the final course grade. The results also indicated significant differences in the means of students' self-perceived confidence and the documentation assignment between the various categories of student integration.

KEYWORDS: Physical therapy curriculum, health science education, patient integration experience, doctor of physical therapy program, curriculum, education.

INTRODUCTION:

Upon graduation from a Doctor of Physical Therapy (DPT) program, it is expected that a graduate of the program will demonstrate the clinical skill set to safely assess and treat a patient with a movement disorder due to conditions varying from a musculoskeletal to neurological pathologies¹. As part of the DPT program curriculum, students will be exposed to various courses to help attain this competency level, including didactic courses, practical laboratory courses, and clinical education experiences. Throughout a DPT program, students will also get exposed to a variety of teaching methods including lecture, case-based learning, systems-based learning, and problem-based learning¹. While it is expected that students will be exposed to patients in the clinical internship, integrating patients into the classroom setting as a form of teaching is not required^{1,2}.

Teaching methods in a DPT program will vary based on the program and course learning outcomes, needs of specific lessons, student body preference, and faculty preference. Despite the need to meet the specific accreditation standards, there is no existing blueprint on what teaching methods can be best utilized to challenge overall student competence. Problem-based learning is a commonly utilized teaching method in physical therapy programs, where small groups of students are directed to study a problem with guidance from the faculty compared to a traditional faculty-led lecture³. Systems-based learning, also a commonly used teaching format in physical therapy programs, is focused on the principle of teaching an entire system to a student and requires the student to appreciate both the primary and clinical science of that system⁴. Case-based learning is commonly used in physical therapy programs and focuses on using a patient case to meet the lesson's objective whereby the student can learn using a real-life situation⁵. Lecturing is still believed to be the most common form of teaching method used in all healthcare professions education and involves the faculty member leading discussion where he can share with large numbers of students at once⁶.

Within a neuromuscular course in a large private DPT program spanning four campuses in the United States (U.S.), a combination of teaching methods is utilized to facilitate DPT students on the physical therapy examination process of neuromuscular conditions. Traditional lecture, problem-based learning, and case-based learning are utilized to teach the essential skills associated with a neuromuscular examination. One of the methods utilized is incorporating patients in the classroom for patient integration skill labs. Patient integration modes do vary between the campuses. The variances include the use of patient encounters in an acute rehabilitation hospital, patient encounters on campus, patient encounters via a telehealth platform, patient simulations, and case-based patients using established written and video cases.

The use of patients in the classroom as a teaching method has been a prominent

form of education in medical and nursing programs⁷. Providing healthcare professionals access to actual patients early in their curriculum can lead to a positive educational experience by providing the students with "real-life" examples of what they will be encountering during clinical internships and in the workforce. While there was an anecdotal belief in this approach, there was a significant lack of evidence to support this statement⁷. Within medical school curriculums, patient integration has been found to improve understanding of concepts learned in class, build relationships with patients, and students felt a need to include patient integration in more classes^{8,9}.

Problem:

The problem addressed by this quantitative correlational design study is that various forms of patient integration teaching methods used within a neuromuscular course may affect students' perceived confidence and performance when completing a physical therapy examination on a patient with a neuromuscular pathology. Further, it was not known if there was a difference in effectiveness between patient integration teaching methods used within the university's neuromuscular course to be studied. While various studies exist to support the use of patient integration in DPT courses, there is limited research comparing various teaching methods to facilitate patient integration in a DPT course, specifically a neuromuscular course¹⁰.

While accreditation standards do not mandate patient integration within a DPT course, patient integration might provide students the added educational experience to be better prepared for actual clinical performance with patients on clinical internship and eventually in the workforce. Gathering perceived confidence survey scores and performance scores on various assessments within the neuromuscular course could create a better understanding of the potential effect that patient integration has on the students' learning of the established course learning objectives. Limited research exists in the area of patient integration within a DPT course, specifically a neuromuscular course. There is also limited research on the effectiveness of patient integration within other healthcare educational programs.

Purpose:

The purpose of this quantitative correlational design study was to determine if various forms of patient integration teaching methods used within a neuromuscular course may impact students' perceived confidence and performance when completing a physical therapy examination on a patient with a neuromuscular pathology. All students within the DPT curriculum have been exposed to patient integration within the required neuromuscular course. The patient integration lab was the primary route for patient exposure for the students that were assessed. Students from four distinct campuses within the university were assessed. The following variables were assessed to determine the overall

effectiveness of the patient integration labs: student performance in the class as assessed by the final course average and a documentation assignment grade and results from two validated self-perception surveys. The study's target population comprised of DPT students within a large private DPT program in the U.S., who completed the neuromuscular course between the fall 2019 and fall 2020 semesters.

While patient integration is commonly used throughout the university's neuromuscular courses, there is a need for further evidence to support its efficacy. This study provided a novel assessment of the use of this teaching method within the neuromuscular course in the DPT program. This study also provided educators insight on the students' perceptions and performance with this teaching method and fill a gap in the current literature. Educators from various healthcare programs will be able to access this study's results and assess the potential of integrating this teaching method into their classrooms.

The following research questions guided this quantitative correlational design study:

- RQ 1:** Do mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire differ at a statistically significant level among various categories of patient integration activities in a Doctor of Physical Therapy neuromuscular course?
- RQ 2:** Do mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey differ at a statistically significant level among various categories of patient integration activities in a Doctor of Physical Therapy neuromuscular course?
- RQ 3:** Do mean scores of students' assessments as measured by a documentation assignment differ at a statistically significant level among various categories of patient integration activities in a Doctor of Physical Therapy neuromuscular course?
- RQ 4:** Do mean scores of students' assessments as measured by a final course average differ at a statistically significant level among various categories of patient integration activities in a Doctor of Physical Therapy neuromuscular course?
- RQ 5:** Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a documentation assignment?
- RQ 6:** Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a final course average?
- RQ 7:** Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a documentation assignment?
- RQ 8:** Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a final course average?

HYPOTHESIS:

The hypotheses for this study were formulated based on the principles of experiential learning. There was an overall expectation that a change would be noted with student performance and perceived confidence after completing the patient integration labs. There was also an expectation that differences would exist between the various teaching methods. The following hypotheses will be tested:

- H₁:** Mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire will differ among the various categories of student integration.
- H₂:** Mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey will differ among the various categories of student integration.
- H₃:** Mean scores of students' assessments as measured by a documentation assignment in a Doctor of Physical Therapy neuromuscular course will differ among the various categories of student integration.

- H₄:** Mean scores of students' assessments as measured by the final course average in a Doctor of Physical Therapy neuromuscular course will differ among the various categories of student integration.
- H₅:** A relationship will exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a Physiotherapy Self-Efficacy Questionnaire with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a documentation assignment.
- H₆:** A relationship will exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a Physiotherapy Self-Efficacy Questionnaire with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a final course average?
- H₇:** A relationship will exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the student perception survey with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a documentation assignment?
- H₈:** A relationship will exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the student perception survey with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a final course average?

MATERIALS AND METHODS:

This study was a correlational quantitative design study assessing the results of students' performance within a neuromuscular course and with students' self-reported confidence surveys. The use of self-perceived confidence scales was used to measure the experiential learning effectiveness¹⁰. The use of assessment outcomes and student grades in DPT courses have been utilized to demonstrate the effectiveness of teaching methods¹¹. The methodology was feasible, as grades were accessible for data collection and surveys were facilitated through an online platform to current students in the DPT program.

This study's research design was a quantitative correlational design study. The study examined the following teaching methods to determine if they affected student grades and students' perceptions of confidence: patient simulation integration laboratory, patient integration laboratory in an acute rehabilitation hospital setting, patient integration in a university classroom setting, patient integration utilizing a telehealth platform, patient integration utilizing a case study, written or video, or no form of patient integration. The patient simulation integration laboratory involves the use of a case-based standardized patient whereby the student is able to complete a neurological examination on a standardized patient. The patient integration experience in an acute rehabilitation hospital and university classroom are similar experiences where the student interacts directly with an actual patient with a neurological condition either in the actual classroom setting in the university or the hospital setting under the direct supervision of a licensed physical therapist. The written or video case study does not involve a live or simulated patient but rather a case study that has a written history and or video case. The telehealth experience involves the use of a telehealth platform whereby the student is able to examine an actual patient with a neurological condition under the direct supervision of a licensed physical therapist.

The student grades being analyzed included a neurological examination documentation assignment and the final course grade. The students' perceptions of confidence with various neurological examination skills were analyzed by using a self-perceived confidence scale in the evaluation and treatment of a neurologically impaired individual and a physiotherapy self-efficacy scale¹⁰.

The target population for this study were current DPT students who had taken a neuromuscular course that includes objectives focusing on the completion of a neuromuscular examination. It is expected that all DPT graduates complete a course that includes this specific objective. According to the Commission on Accreditation in Physical Therapy (CAPTE), there were 10,545 graduates from DPT programs in 2019². The sample population used in this study was from a private for-profit university with four campuses in the United States, specifically Florida, Texas, and California. The sample population consisted of students who completed the neuromuscular course in one of the four terms between the fall 2019 term and fall 2020 term across the four campuses, including students in the residential and flex programs. In order to specifically address the lapse in time for those participants who took the neuromuscular course in either the Fall 2019, Spring 2020 or Summer 2020 terms, the survey had the following two components. First, it had an introduction that advised the participants to solely reflect on the experiences from the neuromuscular course being assessed. Second, the survey included a specific question asking the participant's confidence in being able to reflect solely on the identified course, and not other courses that might have an impact on the learning of the skills being assessed. An estimated 1000 students completed the neuromuscular course during this study period.

Survey Data Collection:

The dependent variables included the responses from both self-efficacy and self-confidence surveys being utilized. Both surveys were made available using the Survey Monkey online survey platform. The survey also included co-variables including: name, school specific email, age, gender, race, ethnicity, term that neuromuscular course was completed, and program/campus that neuromuscular course was completed. Data was extracted using its Microsoft Excel download option.

Assessment Data Collection:

The other dependent variables that were collected include an assessment grade and a final course average. Individual faculty for each course section were communicated with by the principal investigator for access to the course gradebook. Approval from the DPT program director of the university was received via a signed letter to allow the primary investigator to request that each faculty extract the gradebook for the class. Each faculty was asked to email their respective gradebook to the primary investigator who then extracted the specific grade points: final course average and neurological documentation assignment grade. The participant's first and last name was used to connect the grade points to the survey results. The data was extracted and housed in an excel document.

Once both forms of data were collected and extracted, a unique study code was assigned to each student. The code corresponded to both data collected from both forms of dependent variables, surveys, and grades, to allow for correlational analysis to be completed. The study identifier codes were a unique five-digit code where the first two numbers correspond to the campus and patient integration method, and the third through fifth digits correspond to the individual participant. Once each participant was provided within a study code designation, all identifying information (name) was deleted to de-identify the students.

RESULTS:

The purpose of this quantitative correlational design study was to determine if various forms of patient integration teaching methods used within a neuromuscular course may impact students' perceived confidence and performance when completing a physical therapy examination on a patient with a neuromuscular pathology. The study also aimed to determine if there was a significant difference between the various teaching methods being evaluated. Statistical analysis was performed in three phases. All study variables were initially presented using descriptive statistics.

All research questions were answered using a series of bivariate and multiple variate tests. Specifically, a Pearson's r zero-correlation was used to examine if continuous explanatory variables are significantly related to each dependent variable. An independent-samples t -test was used to examine if dichotomous explanatory variables were significantly related to each dependent variable. Lastly, a One-Way ANOVA was used to examine if categorical explanatory variables with three or more categories were significantly related to each dependent variable. Hypotheses testing was done in the context of the full multivariate model. A multiple linear regression model was used to model each dependent variable as a function of the explanatory variables significantly related to that dependent variable in bivariate analysis.

Research question 1 asked if the mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire differed at a statistically significant level among various categories of patient integration activities in a DPT neuromuscular course. The null hypothesis was rejected as students with no integration and case study integration evidenced significantly lower Jones Student Perceived Confidence scores relative to the patient at hospital integration group.

Research question 2 asked if the mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey differed at a statistically significant level among various categories of patient integration activities in a DPT neuromuscular course. The null hypothesis was accepted as mean scores across all groups did not differ at a statistically significant level.

Research question 3 asked if the mean scores of students' assessments as measured by a documentation assignment differed at a statistically significant level among various categories of patient integration activities in a DPT neuromuscular course. The null hypothesis was rejected as students in the simulation and patient on campus group evidenced significantly lower documentation assignment scores relative to the patient at hospital group.

Research question 4 asked if the mean scores of students' assessments as measured by a final course grade differed at a statistically significant level among various categories of patient integration activities in a DPT neuromuscular course. The null hypothesis was accepted as mean scores across all groups did not differ at a statistically significant level.

Research question 5 asked if a relationship existed between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey with student performance in a DPT neuromuscular course as rated by a documentation assignment. The null hypothesis

was accepted as documentation assignment scores were not related to Jones Student Perceived Confidence scores.

Research question 6 asked if a relationship existed between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey with student performance in a DPT neuromuscular course as rated by a final course grade. The null hypothesis was rejected as final course average scores were related to the Jones Student Perceived Confidence scores at a statistically significant level.

Research question 7 asked if a relationship existed between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire with student performance in a DPT neuromuscular course as rated by a documentation assignment. The null hypothesis was accepted as documentation assignment scores were not related to Barta Student Perceived Confidence scores.

Research question 8 asked if a relationship existed between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on Physiotherapy Self-Efficacy Questionnaire with student performance in a DPT neuromuscular course as rated by a final course grade. The null hypothesis was rejected as final course average scores were related to the Barta Student Perceived Confidence scores at a statistically significant level.

Through the various multivariate models used, it was determined that the mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire, as well as the mean scores of student's assessments as measured by a documentation assignment, differed among the various categories of student integration. Through the various multivariate models used, it was determined that no statistical difference between the various categories of student integration existed in the mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey. It was also determined that no statistical difference existed between the various categories of student integration existed in the mean scores of student's assessments as measured by a final course grade. Through both the bivariate and multivariate tests performed, it was determined that a relationship existed between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey with student performance in a DPT neuromuscular course as rated by a final course average. There was a determination that a relationship existed between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire with student performance in a DPT neuromuscular course as rated by a final course average. Through both the bivariate and multivariate tests performed, there was a determination that a relationship did not exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey as well as the Physiotherapy Self-Efficacy Questionnaire with student performance in a DPT neuromuscular course as rated by a documentation assignment.

DISCUSSION:

Research Question 1. *Do mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire differ at a statistically significant level among various categories of patient integration activities in a DPT neuromuscular course?*

This research question investigated whether the dependent variable, students' perceived confidence as rated on the Jones' PSE differed at a statistically significant level among the independent variable of the various categories of patient integration activities. The hypothesis was supported as statistically significant differences were noted between integration groups. At the multivariate level, regarding student integration, the no integration, $B = -.67$, $SE = .34$, $\beta = -.30$, $p < .05$, and case study, $B = -1.14$, $SE = .42$, $\beta = -.51$, $p < .01$, evidenced significantly lower Jones' PSE scores relative to the patient at hospital integration group. The mean scores between two similar integrations, patient at hospital and patient on campus were found to have little variance, $M = 3.88$, $M = 3.86$. The mean scores for simulation and telehealth were not found to significantly differ from the patient at hospital.

These findings demonstrate that student confidence was the highest when provided with an integration class that included a patient at hospital, a patient on campus, a telehealth patient or a patient simulation. These findings are consistent with prior studies that demonstrate that patient integration in DPT courses, including the use of simulation, resulted in higher levels of student confidence^{10,12}. The results suggest that all forms of patient integration can have a positive effect on students' perceived confidence. The integration of a patient into the classroom setting allows the student to actively problem solve and experience experiential learning, which is at the foundation of this study.

Research Question 2. *Do mean scores of students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey differ at a statistically significant level among various categories of patient integration activities in a Doctor of Physical Therapy*

neuromuscular course?

This research question investigated whether the dependent variable, students' perceived confidence as rated on the Barta student perception survey differed at a statistically significant level among the independent variable of the various categories of patient integration activities. The hypothesis was rejected as the Barta student perception survey scores were not related to student integration at a statistically significant level when assessed at the multivariate level. The highest mean scores were the simulation group, $M=3.25$, followed by patient on campus and patient on hospital, $M=3.09$ and $M=3.03$. The mean score for no integration resulted was the lowest, $M=2.64$.

While the results at the univariate level are similar to research question one, the differences in the means are not significant to support the hypothesis. These findings are inconsistent with prior studies that demonstrate that patient integration in DPT courses, including the use of simulation, resulted in higher levels of student confidence^{10,12}. Both surveys specifically assess student confidence when performing a neurological examination. The most significant variance between the surveys is that the Barta survey only has ten questions with four of them specifically focused on neurological examination, while the Jones survey was a total of 13 questions, with six questions focused on neurological examination. The Barta surveys ask questions, such as confidence associated with managing a neurological caseload, which might have a negative effect on the confidence scores since such questions are not addressed in the context of the examined neurological course.

Research Question 3. *Do mean scores of students' assessments as measured by a documentation assignment differ at a statistically significant level among various categories of patient integration activities in a DPT neuromuscular course?*

This research question investigated whether the dependent variable, students' assessments as measured by a documentation assignment differed at a statistically significant level among the independent variable of the various categories of patient integration activities. Within the studied groups, each student completed a standardized neurological examination documentation assignment. The hypothesis was supported as statistically significant differences were noted between integration groups. At the multivariate level, documentation assignment scores were related to student integration at a statistically significant level, where the patient on campus group, $B=-14.87$, $SE=2.73$, $\beta=-.63$, $p<.001$, and simulation group, $B=-13.43$, $SE=4.85$, $\beta=-.55$, $p<.01$, evidenced significantly lower documentation assignment scores relative to the patient at hospital group.

The results specific to this research question indicate that the patient at the hospital group had the highest average within the documentation assignment, $M=99.41$, and were significantly higher than the simulation and patient on campus groups, $M=83.71$ and $M=89.54$. Similar to the findings in the student confidence results, the highest means were the patient at the hospital group. This finding remains consistent with prior literature that patient integration has a positive effect on patient performance in the classroom¹³.

While differences were noted within the groups, it is the finding that the no integration group did not differ significantly from the patient at hospital group that is most puzzling. The foundational theory of the study is that utilization of a patient in the classroom setting will have an effect on the learning experience by the use of experiential learning. The lack of experiential learning opportunity in the no integration group would lead one to believe that mean scores of self-confidence and the documentation assessment would be the lowest. However, the results indicate otherwise and show that the mean scores for this group were the second highest, $M=98.39$, and not significantly different from the patient at hospital group. One possible explanation is that while the documentation assignment was a standardized assignment across all groups, the consistency of grading could vary between graders based on experience with the established rubric.

Research Question 4. *Do mean scores of students' assessments as measured by a final course average differ at a statistically significant level among various categories of patient integration activities in a Doctor of Physical Therapy neuromuscular course?*

This research question investigated whether the dependent variable, students' assessments as measured by a course final grade differed at a statistically significant level among the independent variable of the various categories of patient integration activities. Each of the groups were measured on the same grade distribution within the course whereby examinations, assignments and laboratory activities were all weighed evenly. While weighed evenly, there were some variances between the examinations provided, types of assignments and types of lab practical examinations. The hypothesis was rejected as data indicated that at the multivariate level, final course average scores were not related to student integration at a statistically significant level.

When assessing the means at the univariate level, the patient at hospital group once again had the highest mean, $M=88.18$. This mean, however, did not differ significantly from any of the other groups at the multivariate level. The no integration group, $M=87.21$, was the second highest mean while the patient on campus group was the third highest mean, $M=86.66$. The results specific to this research question do not coincide with prior research in DPT courses that deter-

mined that patient integration had an effect on student performance in class¹³. Further, the finding that the no integration groups was the second highest continues to be puzzling as noted in the prior research question discussion. One possible explanation is that while students that did not have a specific integration lab to help facilitate the learning experience within the course, students were challenged with other learning activities that would allow them to meet the course objectives. By doing so, positive results in course grades will also be seen as the course grade is not solely based on the integration lab experience.

Research Question 5. *Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a documentation assignment?*

Research question five looked to assess whether or not a relationship existed between two dependent variables, students' perceived confidence as rated on the Jones' PSE and student assessment, as rated by a documentation assignment. The hypothesis was rejected as the documentation assignment scores were not related to the Jones' survey scores, $B=.47$, $SE=.47$, $\beta=.04$, $p=.32$, at a statistically significant level. It was believed that a student with a higher level of self-perceived confidence would result in a higher assessment grade as rated on a documentation assignment.

There is limited literature to specifically support the relationship between self-confidence and student performance after the use of patient integration labs in a DPT course. A primary purpose of this study was to fill this gap in the existing literature. While the literature is limited, there are studies that allude to the possible relationship between self-confidence and student performance following a patient integration experience^{10,13}. The results within this research question are not consistent with the implications of the established literature. One possible explanation is that the documentation assignment captures a small part of the neurological examination which include the capacity to document findings and assessment. The integration experience specifically challenges the student to critically think and apply learned knowledge in the real-time. It is possible that another form of assessment such as a psychomotor assessment, such as a lab practical exam, might better correlate to student confidence since the integration lab challenges various forms of psychomotor skills.

Research Question 6. *Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on the Physiotherapy Self-Efficacy Questionnaire with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a final course average?*

Research question six looked to assess whether or not a relationship existed between two dependent variables, students' perceived confidence as rated on the Jones' PSE and student assessment, as rated by a final course average. The hypothesis was supported. At the multivariate level, final course average scores were related to Jones' survey scores at a statistically significant level, $B=.98$, $SE=.36$, $\beta=.17$, $p<.01$. As was the case in the prior research question, it was believed that a student with a higher level of self-perceived confidence would result in a higher assessment grade as rated on a final course grade.

The findings to this research question are consistent with prior studies that implicate the possibility of a relationship between student confidence and performance after a patient integration lab experience^{10,13}. The final course average accounts for all aspects of the course including both the documentation assignment and the final examination which questions the students on content covered in the integration lab. While the documentation assignment did not demonstrate a relationship, the presence of a relationship between student perceived self-confidence and course final grade leads to the belief that a student with a higher confidence in completing a neurological examination will perform better in the neurological course. Being that a primary course objective is to demonstrate knowledge and competency in completing a neurological examination, the findings are consistent with the established hypothesis of this study.

Research Question 7. *Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a documentation assignment?*

Research question seven looked to assess whether or not a relationship existed between two dependent variables, students' perceived confidence as rated on the Barta students' perception survey and student assessment, as rated by a documentation assignment. The hypothesis was rejected as the documentation assignment scores were not related to the Barta survey scores, $r(250)=.01$, $p=.85$, at a statistically significant level. It was believed that a student with a higher level of self-perceived confidence would result in a higher assessment grade as rated on a documentation assignment. The findings to this research question were consistent with the findings to research question five. Both questions asked whether or not a relationship existed between student confidence and student assessment using a documentation assignment. The possible rationale for a lack of relationship is

explained in the discussion following research question five.

Research Question 8. *Does a relationship exist between students' perceived confidence when completing a neuromuscular physical therapy examination as rated on a student perception survey with student performance in a Doctor of Physical Therapy neuromuscular course as rated by a final course average?*

Research question eight looked to assess whether or not a relationship existed between two dependent variables, students' perceived confidence as rated on the Barta students' perception survey and student assessment, as rated by a final course average. The hypothesis was supported. At the multivariate level, final course average scores were related to Barta survey scores at a statistically significant level, $B=1.31$, $SE=.41$, $\beta=.20$, $p<.01$. It was believed that a student with a higher level of self-perceived confidence would result in a higher assessment grade as rated on a final course grade.

The results for research question eight are comparable to the results of research question six. Both questions assessed a possible relationship between student confidence and student performance as rated by assessment of a final course average. As discussed prior, existing literature alludes to the possible relationship between student confidence and student performance in class following an integration experience^{10,13}. This research question supports the notion that a relationship does exist between student confidence and student performance following a patient integration experience in a course.

CONCLUSIONS:

The current study was subject to study design and statistical limitations. First, data was collected from a convenience sample from one private university's DPT program, limiting the overall sample size. This study was conducted in four university campuses in Florida, California, and Texas. Because of the limited sample, there are limitations to the generalizability of the findings across all DPT programs and regions.

Second, data was limited to the students who selected to participate in the study. While all students who completed the course during the designated time were sent an invitation to the study, not all students selected to participate ($n=252$, 30.96% of all students who took the course). As a result, there may be a selection bias as the subjects may have elected to participate because of a positive experience in the course or the integration lab resulting in a higher motivation to the complete the study. The study also had no funding, which could have also limited the overall participation of the students exposed to the integration experience. Student self-confidence was also assessed using self-reported confidence surveys. It was assumed that each of the participants completed the surveys honestly and without bias.

Third, the study utilized a quantitative correlational design study whereby no control group was utilized. While the study did not aim to compare to a control group, implications of the findings can be limited by the study design. Possible variations to the study design are discussed in the recommendations for future research. Finally, the study was limited to assessing a neurological course within a DPT program. The study did not assess the effectiveness of patient integration in other DPT courses or in other healthcare education programs. Recommendations for future research will be discussed.

Further research to investigate the effectiveness of patient integration in a DPT classroom as well as other healthcare professional classrooms is warranted. It is first recommended that sample size be increased and assessed across multiple universities and regions to challenge the generalizability of the results from this study. Results from this expanded study may help to better differentiate the results between each of the integration groups and better determine relationships between the groups and the documentation assignment. Future studies may also look to assess the effectiveness of various patient integration labs in other healthcare programs such as medicine, nursing or occupational therapy.

This study utilized a quantitative correlational design. Future research may consider varying the research design to expand on the current findings. The potential to utilize a randomized control study that assesses effectiveness of various forms of patient integration in a pre-post design could provide further results to delineate between the differences in the patient integration labs. A future qualitative assessment of patient integration labs could create open-ended questions which would help to strengthen the data from this current quantitative study.

Upon graduation from a DPT program, students are expected to have the clinical skills to effectively perform a neurological examination. To attain this level of competency, students are exposed to various teaching methods within the neurological curriculum of the program. A possible teaching method that can be utilized is patient integration to challenge experiential learning. This study aimed at assessing the effectiveness of patient integration within a neurological course in a DPT program. Six groups were assessed using two student confidence surveys and two student assessments. The study assessed for possible differences in the means of the four dependent variables between the various groups. The study also evaluated the possible relationships that exist between the dependent variables. This study showed that student confidence, as rated on the Jones PSE, was significantly different among the six groups. Further results demonstrated a rela-

tionship exists between student confidence, as rated by both the Jones PSE and Barta self-perception survey, and student assessment, as rated by final course grade.

This study suggests that patient integration within a neurological course in a DPT program can be effective in increasing the confidence of students when performing a neurological examination. Further, the results suggest student confidence following a patient integration experience in a neurological course in the DPT program can have a positive effect on student performance in the course. Further research is suggested, including investigating a larger population across universities and regions, a qualitative assessment, and an investigation of a different population of another healthcare professional program to further generalize the existing findings.

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